Ultrasonic Peening System
P-4

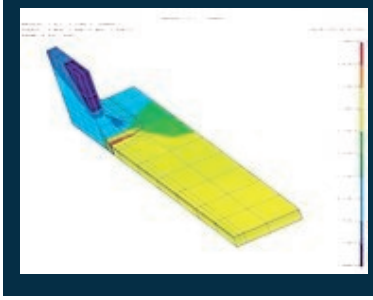
ULTRASONIC PEENING

Ultrasonic Peening is a post weld treatment that increases resistance against fatigue cracking. The treatment can be applied in production or when 50% of the fatigue life of a weld connection has been consumed, in this case the fatigue life of this weld will be reset to zero. Likewise any weld with irregularities or uneven quality would be restored to an acceptable level by ultrasonic peening treatment. The treatment combines the benefit of weld-toe geometric modification and the redistribution weld induced tensile residual stresses at the HAZ (heat affected zone).

ADVANTAGES:

Ultrasonic peening is the preferred fatigue life extension method for in-situ applications. It performs three distinct improvements during one treatment operation:

* Removal of weld defects.
* Lowers stress concentrations.
* Redistributes tensile stresses and/or introduction of compressive stresses.



The Aktive Arc Ultrasonics Group has developed and delivered its ultrasonic peening equipment for over 14 years.
Our clients have extensive hands-on experience in shipboard weld treatment and structural weld treatment such as wind generator towers. These include areas with difficult access and tough working conditions. Therefore we have a clear understanding of equipment requirements and the necessary robustness for onshore and offshore applications.
Our new line of Ultrasonic Peening Systems is based on a 4th generation design utilizing a number of refined changes to make our equipment suitable for the most demanding tasks.

Onshore or Offshore Applications

- Wind Generator Towers, Pipe Lines, Bridges, Ship & Platform building post weld treatments. Ultrasonic peening is recommended as preventative treatment of weld sections expected to be under high stress.
- In service Shipboard weld treatment of:
  * Damaged weld sections following weld repair to extend life of vessel.
  * Preventative treatment of welds under high stress.
- Reduce tensile stresses, introduce compressive stresses and remove surface defects. Decreases residual stress with 400MPa at the surface and up to 2mm deep. This is of great benefit to a wide range of structures, including brackets, web frames, crane frames, etc.

Weld Peening & Life Extension

Ultrasonic peening is a highly effective engineering solution used to avoid premature fatigue cracking in high stressed areas.
The aim with the ultrasonic peening treatment on post weld repairs is to avoid future weld repair and contribute to the structural integrity of the installation during its remaining service life.
Fatigue life extension has been achieved by the application of ultrasonic peening to high stressed areas. For example the pallet stool and the
longitudinal-weld details on the ballast tanks in FPSO installations.
The fatigue life for the treated welds were extended to twenty years which is the targeted service life for the installation.

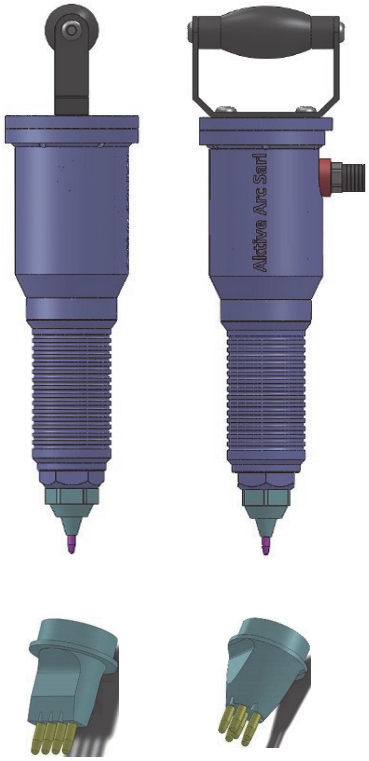
P-4 System Specifications

THE PROBLEM:

Example Premature Fatigue Cracking on Pallet Stool Weld. Uncertainties in load spectra and the hull's response are the main reason to early signs of degradation as premature fatigue cracking. Further signs of early hull degradation could be coating damage in high stressed areas in ballast tanks among others.

ULTRASONIC PEENING SOLUTION:

Welds and surfaces are significantly improved by hammering the steel surface with a hardened steel peen at a high frequency. Due to the high intensity and frequency of the strikes the steel peen creates a smooth transition between plate and weld, called the weld toe groove. The powerful peen strike makes a compressive layer at the treated surface. This layer greatly increases the weld-toe resistance against fatigue cracks.



System:
- Power Options: 400W, 1000W, or 1500W
- System Output Frequency: 20 kHz

Hand Tool:
- Length 420 mm
- Weight approx. 2.8 kg
- Includes single pin working head, two or three pins in line working head, and multi-striker.
- Combined air and electrical inlet allow use of single hose line to power and air supply station.
- Sliding outer housing with spring shock absorber to reduce vibration for reduced operator fatigue.
- Non-Corrosive materials

Ultrasonic Power Generator:
- Dimensions: 260 x 85 x 370 mm
- Weight: 4 kg
- Electronic protection measures:
  - Overload
  - Short circuit
  - Over temperature

System Requirements:
Mains Supply: 210 - 250 VAC, 50 - 60Hz
Current Consumption: max. 7 A
Temperature Range -10 to +40°C
Compressed Air (filtered) to hand tool for tool tip cooling

SERVICES AVAILABLE
- Technical Support
- Installation Assistance
- Training
- Maintenance
- Application Support

CUSTOM EQUIPMENT
- Custom Hand Tool Design
- Robotic Mount Options
- Custom Pin Patterns
- Private Branding
- New Application Development
- Custom Frequency

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